United States Department of Agriculture,

BUREAU OF PLANT INDUSTRY,

Seed and Plant Introduction and Distribution,

WASHINGTON, D. C.

COLD-RESISTANT ALFALFAS (*Medicago sativa*).

[Instructions adapted to Wisconsin, Minnesota, North Dakota, South Dakota, and Montana.]

The importance of alfalfa west of the clover section gives it first rank as a forage crop. Even in the clover sections it is advisable to grow alfalfa if it is possible to do so. The reason for this is that pound for pound alfalfa hay is the better feed. Three crops a year can usually be procured, and being a perennial it lasts a number of years when once established. The principal difficulty with alfalfa production in this section has been its liability to winterkill. The cold-resistant alfalfas which are being introduced include the following:

Native hardy strains.—This class of seed is secured from fields of ordinary alfalfa which has proved to be hardy under the severe winter climate of the northern part of the United States.

Turkestan alfalfa.—This seed is imported from Turkestan, and has been found to be hardy in North Dakota, South Dakota, and Montana where the climate is less moist than in the States to the east of these, where this strain does not prove as hardy as some others owing to the apparent injurious effect of the moist climate.

Sand lucern.—This is a hardy strain which is proving resistant to drought and cold and is also better adapted than the ordinary and Turkestan alfalfas to the humid winters of the northern part of the United States east of the Dakotas. In testing this or any of the strains previously mentioned it is important that they all be seeded under the same conditions and side by side if possible. It is desirable that a small plot of ordinary alfalfa be seeded with these special strains to serve as a basis for comparison. The different plots should be marked and a rough diagram made of them to avoid any possible confusion later.

Soil requirements.—Alfalfa requires a deep, fertile, well-drained, warm soil. If the soil in a given section ever needs lime for any crop, it may be considered that it will require liming to produce alfalfa successfully. This point is less important than in the States farther east. The long taproots necessitate a deep, permeable soil. The inability of the plants to withstand poor drainage makes it necessary to provide soil naturally drained. Alfalfa requires a fertile soil, and well-rotted barnyard manure has been found to be the most satisfactory fertilizer. Windbreak protection should be given to prevent the fields from being swept bare of snow during the winter.

Preparation of the soil.—The soil upon which alfalfa is sown should be well settled, but finely pulverized on top. A month or six weeks at least should be allowed for freshly plowed land to settle. Frequent harrowings should be given to settle the land before seeding to produce the necessary fine tilth and to destroy the weeds as they start. Fall plowing is usually necessary, as land freshly plowed in the spring will hardly have time to settle before the planting season. Corn stubble land may, however, be disked in the spring and still have time to become sufficiently settled. In the semiarid portions of this section care must be taken to conserve the moisture by proper methods of culture previous to seeding. It may be necessary in some sections to let the land lie fallow the preceding season, harrowing to maintain a dust mulch and to destroy the successive crops of weed seedlings as they appear. Harrowing the alfalfa stubble after each cutting is also advisable in the semiarid sections.

Inoculation.—If the soil lacks the proper nitrogen-fixing bacteria, it is necessary to supply this at the time of seeding. This can be done either by artificial cultures or by scattering soil from an alfalfa field known to be supplied with root tubercles, or nodules. This soil should be broadcasted at the rate of 250 to 500 pounds per acre and harrowed in immediately. The spreading should take place on a cloudy day or in the evening, as the sun's rays are destructive to the germs. Care should be taken to avoid the introduction of noxious weeds or fungous diseases. Soil from the roots of sweet clover will also inoculate alfalfa. It should be spread as suggested for soil from an old alfalfa field.

Seeding.—The seed should be sown in the late spring at the rate of 20 pounds per acre, generally without a nurse crop, although in Wisconsin a nurse crop has frequently been successfully used. A light seeding of beardless barley or oats should be made if a nurse crop is used. The grain should be cut early for hay if it threatens to choke out the alfalfa plants or if the season proves to be unusually dry. The seed may be drilled or sown broadcast and covered lightly with a smoothing harrow. A much more even stand may usually be secured by seeding one-half of the seed north and south and the other half east and west. Alfalfa should be sown on land which is reasonably free from weeds, as it makes a rather slow growth at first, and the spring-sown plants are likely to be choked out by the weeds of midsummer. For this reason it is usually advisable to seed alfalfa upon land which has been in clean-cultivated crops for several years.

Treatment of the stand.—Unless the weeds threaten to choke out the young plants they should not be clipped until the alfalfa plants are 12 to 15 inches high and are beginning to bloom. The cutter bar of the mower should be set high, as the alfalfa will be checked in its growth and is likely to be injured by the next crop of weeds if cut low. If the first cutting is light, it may be left on the land as a mulch. If heavy enough to smother the alfalfa plants, it should be removed. Ordinarily alfalfa should be cut for hay when beginning to bloom. The basal shoots which form the next crop should be well started, but should not be high enough to be clipped by the mower. Under no circumstances should the field be pastured during the first two years, and even an old field had best be pastured sparingly. If green feed is desired, soiling is the best practice. In all cases the alfalfa should be allowed to go into the winter with at least a month's growth, as this will hold the snow and tend to protect the crowns from injury during the winter.

FEBRUARY, 1908.